



City of Mankato

Department of Public Works

March 6, 2013



2012 Biosolids Performance Report

Introduction

The City of Mankato is located in south central Minnesota at the confluence of the Minnesota and Blue Earth Rivers. While the city of Mankato has a population of about 39,500 people the Mankato Wastewater Treatment Plant (WWTP) has a service population of approximately 58,000 people from 5 cities. The service area also includes 2 Sanitary Districts.



The original primary plant was built in the mid 1950's with major expansions occurring in 1974 for construction of a secondary treatment system and a capacity expansion in 2000 in addition to phosphorus and ammonia removal. The design capacity of the plant is 9.38 MGD, a maximum flow of 22.0 MGD and a hydraulic capacity of 44.0 MGD. Treatment currently consists of primary settling and chemical phosphorus removal, extended aeration to include ammonia removal, clarification and disinfection. The solids train includes DAF, anaerobic digestion, belt filter press, storage and land application.

A natural gas-fired turbine electrical generating plant utilizes up to 6.2 MGD of our effluent for cooling water. In exchange for our effluent water the power company has built a 12 MGD phosphorus removal system, filtration and chlorination to meet California Title 22 Standards for Reuse Water. It is owned and located at the Mankato WWTP. In addition, effluent water is being used in the sprinkler system of a nearby city park. A new disposal station has been built with reuse water available for truck washing and a fill station for other uses such as sod establishment, street cleaning, etc.

The Mankato WWTP staff consists of eleven full-time positions. There are five operators, two maintenance, two laboratory personnel, a plant foreperson and a wastewater superintendent. The plant is staffed 8 hours per day 7 days per week. A SCADA system relays alarms to the Mankato Water Treatment Plant which is staffed 24 hours per day. One of the WWTP operators is on-call at all times. The laboratory normally has 2 interns from the local university to assist with sampling as well as projects such as sources of pollutants for our source reduction program and water quality sampling from internal watersheds to assist with community development planning.

The Mankato WWTP has Delegated Authority over its Pretreatment Program. Currently there are 8 Significant Industrial Users, 7 Categorical Industrial User and approximately 30 Industrial Users. The focus of the Pretreatment Program is to reduce pollutants at the source, to prevent upsets to the wastewater treatment plant, to prevent pass-through, and to improve the quality of the two end products: Clean effluent water to the Minnesota River and quality biosolids for land application.

Three primary anaerobic digesters are heated with waste gas and then transferred to the secondary storage tank. Five days per week the biosolids are withdrawn and dewatered through a Belt Filter Press and stored on site in a covered bunker.

The Mankato WWTP was part of a third round of agencies participating in the National Biosolids Partnership (NBP) Biosolids Management Program (BMP) for biosolids.

Development of our BMP program started in 2005 with the creation of an internal BMP

team. Team members attended four NBP sponsored workshops which helped guide the development of our BMP. The City of Mankato applied for NBP certification and was certified in January 2010.

Belt Filter Press

Last year our facility produced approximately 5700 wet tons of filter press cake. The City utilizes the Komline-Sanderson filter press process which

includes two filter presses that have been operating since 2000. The primary sludge and waste activated sludge are thickened using the dissolved air flotation system. It is then sent to the anaerobic digesters for an average of 52 days and then sent to the belt filter press for dewatering.



This process meets the pathogen destruction requirements of 40 CFR Part 503 regulations for Class B biosolids. Resulting cake solids are approximately 18-21%. The biosolids are then land applied according to the Minnesota Rules Chapter 7041.

Beneficial Reuse

The City of Mankato land applied biosolids in February and October of 2012. After harvest in the fall the City's Street Division hauls the biosolids to nearby farmland. The



city has about six farmers with several hundred acres participating in the land application program. There are many advantages of using biosolids are part of a farmers fertilizer program. The greatest advantage is a reduction in fertilizer costs. Biosolids contain nitrogen. This nitrogen is released slowly over time. Biosolids also contain phosphorus and many micronutrients

that can be beneficial to crop growth.

Another advantage is the addition of organic matter to the soil. Organic matter reduces surface runoff, reduces erosion and improves the water- and nutrient-holding capacity of the soil. Studies have shown increased organic matter content can improve yields. Many of the metals, such as zinc and copper, are essential for plant growth.

City of Mankato Maintains NBP Platinum Level

In February 2012 an independent audit for Mankato's BMP was conducted by DEKRA-Registered Quality, Inc. (Interim Audit #2). Based on this audit, Mankato's program was verified as meeting the National Biosolids Partnership (NBP) requirements and was recommended for continued certification. This is considered maintaining Platinum Level.

The audit found three minor nonconformances and all were corrected. The BMP strengths noted by the audit were:

- The City of Mankato has an extensive and effective public communication program in place, especially considering the size of the agency and the relatively low level of public concern.
- Extensive internal audits are being conducted to continue to improve the management program's conformance with requirements.

The City of Mankato and DEKRA have agreed that the next Interim Audit will occur in 2013.

Internal Audit

An internal audit was conducted to address three minor nonconformances set by the external audit. The nonconformances noted by the audit were:

- Objectives for 2011 have all been achieved and new objectives are being planned. However, biosolids objectives and action plans have not yet been updated for 2012.
- The City of Mankato BMP Emergency Response Manual does not clearly state that contractors are required to have their own emergency plans.
- The Management Review reported in January 2012 did not record planned changes for continually improving the Biosolids Management Program.

Internal audits were conducted for the following processes: Goals and Objectives, Emergency Preparedness and Response, and Management Review.

Outcomes Matter

The NBP has identified key outcomes which serve as good indicators of successful and well managed biosolids management practices. Efforts undertaken by the City of Mankato WWTP during the past year in support of these outcomes are detailed below.

Quality Management Practices

Tracked maintenance activities to better determine program effectiveness. By monitoring the ratio between corrective work and preventive work we are able to determine how effective our maintenance programs are.

Cl₂ analyzers are calibrated quarterly by an outside source. This keeps the meters accurately analyzing the chlorine residual to reduce our chemical usage and save the plant money.

The degree of compliance with our NPDES permit is an indicator of how effectively the facilities are being operated and managed. The plant maintained a compliance record of 100 % in 2012.

Biosolids BMP and all related SOP's have been reviewed and updated and are in the share file to be utilized for document management.

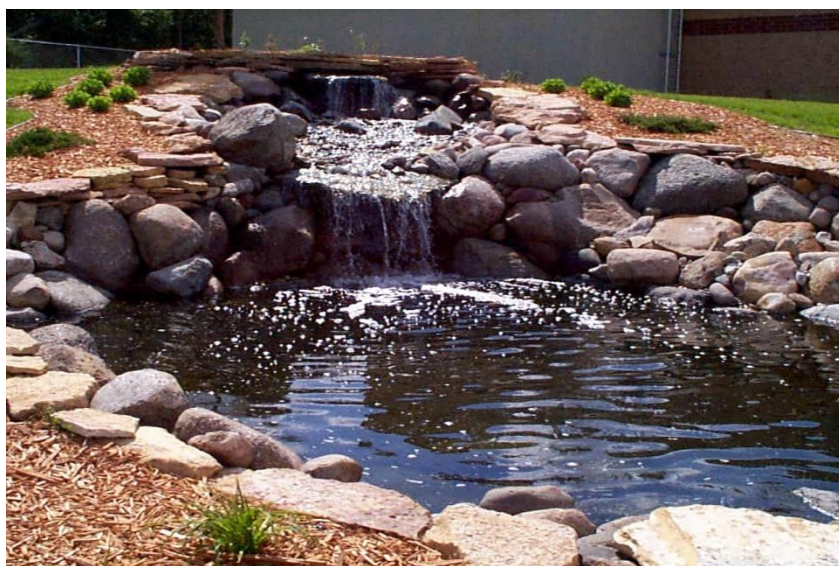
Relations with Interested Parties

Tours of the entire wastewater plant were offered to anyone interested. Brochures about the NBP, biosolids program and contact information is available on the city website as well as at the wastewater plant. The number of “hits” to the site is being monitored.

Regulatory Compliance

The City of Mankato has maintained 100% compliance with all regulatory requirements. Staff involved in data management has received data integrity and ethics training.

Environmental Performance



The City of Mankato has completed its mercury minimization plan which is part of our new permit. The purpose of the mercury minimization plan is to evaluate collection and treatment system to determine possible sources of mercury as well as potential mercury reduction options.

Calpine, a natural gas-fired electrical generating

plant, has been using up to 6.2 MGD of effluent water used for cooling water instead of using ground water. The WWTP has been following California title 22 reuse water standards.

Also by following the Title 22 reuse standards, the City of Mankato is using the effluent water from the WWTP for the sprinkler system at a nearby city park. The WWTP saved an average of 550,000 gallons per day of potable water by using reuse water for plant processes.

Maintaining an effective maintenance management program at the wastewater plant helps ensure reliable equipment and operations and helps to prevent accidental spills.

A motivated staff striving to achieve 100% compliance with all regulatory requirements is focused on protecting the environment. The City of Mankato WWTP staff operates the wastewater plant in a highly effective and professional manner and consistently achieves regulatory compliance.

Annual inspections by the Water Quality Specialist are performed to ensure that no biosolids can wash into the storm drains as per MS4 Storm water program. A fill station has recently been added for reuse water to be used by landscapers, contractors, and other city divisions, further saving the potable water.

Biosolids Value Chain-Monitoring and Measurement Report and Progress

Monitoring and measurement provides critical input to the organization relative to the effectiveness of its operational controls. This information helps to identify any weaknesses or other areas in which the program can be improved.

Significant industrial users-During 2012, the industrial chemist worked with industries and regulators to insure compliance with local, state, and federal discharge laws and tracked industrial reports to insure accuracy and completeness. A reduction in the amount of ferric chloride being added to the waste stream and the amount of biosolids produced was directly correlated to a soybean SIU starting its own pretreatment facility. This also greatly reduced the CBOD and phosphorus loadings coming to the plant.

Industrial user discharges-The industrial chemist reviewed survey questionnaires sent to industrial users and monitored new industrial facilities. Significant industrial user permits were issued to those dischargers meeting the criteria of a significant user.

Discharge authorizations-Discharge requests which are typically short in duration are handled through this process. This allows staff to characterize the nature of the proposed discharge to determine any detrimental impacts that might occur if discharge was allowed to the wastewater plant.

Pollutant minimization-Efforts in this area have historically focused on the discharge of toxic metals, especially mercury. A molybdenum study has also been completed.

Wastewater Treatment and Solids Generation

Solids screening and grit collection- Continued operation of a grinder prior to grit collection. This decreased the wet material sent to the landfill by 75%. It also greatly reduces the amount of rags and larger debris from getting to the pumps and therefore reduces pump wear.



Primary Treatment-There was no change in primary treatment in 2012.

Secondary Treatment- The fourth basin is scheduled for fine air

diffuser replacements in the summer of 2013.

Sludge storage- Biosolids are held in the anaerobic digesters prior to dewatering by the belt filter press. The heat exchanger tubes were replaced which increased heat transfer to the biosolids in the digester and helps with the temperature control needed for pathogen reduction.

Solids Stabilization and Handling

Belt Filter Press-The belt filter press equipment operation was as expected with no process upsets during the year. Belts on both presses were replaced in 2012. Caked biosolids averaged 19.9%.

Biosolids End Use

Land application-The City of Mankato WWTP had 100% land application of biosolids. New fields were sampled for future land applications.

Current Year Goals and Objectives

An important component of our Biosolids EMS is continual improvement. Annually goals are identified based on key outcomes, biosolids value chain, or BMP improvements. During the past year, staff determined the following goals would help us achieve these objectives.

Increase public awareness

- Monitor the number of hits to the website to see any increases.
- Continue to give tours to the public upon request.

Beneficial reuse

- Continue 100% land application of biosolids.
- Obtain 2 new fields for biosolids land applications.

Regulatory Compliance

- Data integrity and ethics training to be provided for all staff.
- Maintain 100 % compliance.

Environmental

- Expanded the pharmaceutical take back program by adding more drop boxes.

- Continued use of reuse water for street cleaning, park sprinkler system, and within the plant.
- Notify contractors of reuse water availability.

Regulatory Compliance

The biosolids produced by the City of Mankato WWTP have consistently met all standards for Class B biosolids and are well below the regulatory limits for metal concentrations as shown in the attached chart. There have been no Notices of Violation for biosolids production and the City has exceeded the State of Minnesota guidelines for land application.

Contact Information

For more information about the City of Mankato WWTP Biosolids Management Program, to provide comment or input to the program, please contact Jim Bruender, WWTP Superintendent at 507-387-8666 or email at jbruender@city.mankato.mn.us.

Also, please visit the City of Mankato Biosolids webpage at <http://www.mankato-mn.gov/Wastewater-Treatment/Page.aspx>.

For further information on biosolids please visit The National Biosolids Partnership website at <http://www.wef.org/biosolids/>

Biosolids Metals Content

■ EPA Limit ■ 2012 Mankato Average

